

Brookhaven National Laboratory National Synchrotron Light Source		Number: LS-PPS-0022	Revision: B
		Effective: 5/10/02	Page 1 of 6
Subject: <u>VUV Ring Radiological Interlock Test</u>			
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*Approval signatures on file with master copy.

[Revision/Periodic Review Log](#)

Test Reason:	Test Result: <input type="checkbox"/> Passed <input type="checkbox"/> Failed	
	Test Type: <input type="checkbox"/> Full <input type="checkbox"/> Partial	
Test Date:	Start Time:	Finish Time:
Tester 1:	Assistant 1:	
Tester 2:	Assistant 2:	

PREPARATION:

- a. Inform Control Room Operator that a VUV Interlock test will be done. _____
 - b. LOTO the LEBT valve and LINAC low level RF amplifier. _____
 - c. Verify VUV main power supplies and LINAC modulators are in a ready state where they can be turned ON. _____
-
1. Search the VUV ring with one person remaining inside at the security control rack. The person outside times the audible alarm. _____
 Audible alarm sounds for at least 15 seconds _____

 The person inside watches the VUV ring Secure 'A' indicator.
 The indicator lights after the warning sound is complete _____
 The Area Secured light in the control room is on. _____
 The five beacons surrounding the VUV ring are flashing. _____
 2. Open the entry gate. _____

 Observe the Ring Secure 'A' & 'B' indicators go out _____
 The indicator on CS-E goes out _____
 The five beacons surrounding the ring go out. _____
 The Area Secured light in the control room is out. _____
 An alarm is reported to the control room alarm panel/micro. _____

 Close the gate. _____
 3. Press CS-E (Check station at exit). _____
 Pilot on CS-E does not come on _____
 The ring interlock does not activate _____

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4. Press CS-2, CS-3, CS-4 and CS-E.
Neither pilot light stays on _____
Open the gate and then close the gate. _____
Press in order CS-4, CS-3, CS-2, CS-1 & CS-E
Interlock does not activate. _____
Open the gate and then close the gate. _____

5. Press CS-1 and start timing.
The check station pilot lights turn off in less than 2 min. _____
Press in order CS-2, CS-3, CS-4, and CS-E
Pilot on CS-E does not come on _____
Ring interlock does not activate. _____

6. Test the following emergency stop switches one at a time below.
ES1 - Emergency Stop on VUV security rack
ES2 - Emergency Stop on VUV mezzanine
ES3 - Emergency Stop on VUV wall (near U11)
ES4 - Emergency Stop in control room. Note: ES4 will drop security in LINAC/Booster and VUV ring.

	<u>ES 1</u>	<u>ES2</u>	<u>ES3</u>	<u>ES4</u>
Press an emergency stop.				
ES pilot 'A' in security rack goes out	_____	_____	_____	_____
ES pilot 'B' in security rack goes out	_____	_____	_____	_____
Emergency Stop Latch 'A' indicator goes out	_____	_____	_____	_____
Emergency Stop Latch 'B' indicator goes out	_____	_____	_____	_____
Reset emergency stop				
ES pilot 'A' in security rack come ON	_____	_____	_____	_____
ES pilot 'B' in security rack come ON	_____	_____	_____	_____
Emergency Stop Latch 'A' indicator remains out	_____	_____	_____	_____
Emergency Stop Latch 'B' indicator remains out	_____	_____	_____	_____
Press the reset switch on the security rack				
Emergency Stop Latch 'A' indicator comes ON.	_____	_____	_____	_____
Emergency Stop Latch 'B' indicator comes ON.	_____	_____	_____	_____

7. Rotate the lockout switch to OFF and attempt to secure the VUV ring.
Observe the ring does not secure. _____
Rotate the lockout switch to the ON position. _____

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- The modulators Chain A drops out momentarily until the injection shutter closes.

'A' Chain Set point	
Orig.	New

'B' Chain Set point	
Orig.	New

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15. Open the injection shutter. Open the VUV gate.

Observe the injection shutter closes.

Modulators A and B chains momentarily drop out until the injection shutter closes.

An audible warning sounds in the VUV for 5 seconds when the gate is opened.

VUV Security Alarm sounds in Control Room

Re-secure the VUV ring.

16. Switch to Access Mode with the control room switch. Press Entry Permit button in control room.

Lock releases on gate and sign changes to green.

Open the gate.

VUV interlock does not dump.

Close gate, release permit button.

Gate is locked

Open gate by releasing lock on inside of gate.

VUV interlock dumps

17. Re-secure the VUV ring. While in Access Mode and injection shutter enable state (i.e. dipole current in range) attempt to open the injection shutter.

The VUV injection shutter does not open.

Open the injection shutter using the jumper cable designed for that purpose.

Observe that the modulators A chain drops out while the injection shutter is open.

18. Switch from Access mode to Normal

Observe an audible warning sounds in the VUV area for 10 to 15 seconds

19. Break security using the Interlock Off button on Mezzanine.

Observe that there is no audible warning in the VUV ring.

Pilot Light on CSE goes out

VUV interlock drops out

Search VUV ring

Break security using the Interlock Off button on VUV Security Rack.

Observe that there is no audible warning in the VUV ring.

Pilot Light on CSE goes out

VUV interlock drops out

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20. Place holders on gate switches A and B and then secure the VUV ring.
 Open the injection shutter and turn on VUV power supplies as listed below.
 Remove the B switch holder. Observe the following:

The modulators 'A' & 'B' chain drops out momentarily
 until the injection shutter closes.

The 'B' Chain trips first

The SR9 VUV Ring Secure 'A' indicator stays ON.

The SR9 VUV Ring Secure 'B' indicator goes out.

	Power Supply									
	Dipole	Q1	Q2	Q3	Q4	Q5	Q6	Q7	SEXT F	SEXT D
Dipole trips off	_____									
Remaining power supplies stay ON		_____	_____	_____	_____	_____	_____	_____	_____	_____
Indicator shows trip on Dipole	_____									
No Indicator showing trip on remaining supplies		_____	_____	_____	_____	_____	_____	_____	_____	_____
Replace switch holder.										
Use the B Test key (F-300) to reset the B chain										
Observe the B secure light is on.										_____

21. Open the injection shutter and turn on VUV power supplies as listed below.
 Remove the A switch holder.

Modulators 'A' & 'B' chain drops out momentarily until the
 injection shutter closes.

The 'A' Chain trips first

The VUV Ring Secure 'A' indicator goes out.

The VUV Ring Secure 'B' indicator stays ON.

Power Supply	Turns Off	Indicator shows trip
Dipole	_____	_____
Q1	_____	_____
Q2	_____	_____
Q3	_____	_____
Q4	_____	_____
Q5	_____	_____
Q6	_____	_____
Q7	_____	_____
Sext F	_____	_____
Sext D	_____	_____

Replace Switch A Holder

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22. Secure the VUV Ring.

Turn ON RF Systems 1 & 2. Monitor the cavity field. Pull Switch A holder.

RF1

RF2

Observe that RF1 goes OFF for a minimum of 75 ms and RF2 goes OFF for a minimum of 15 ms.

23. Press the Interlock Off button. Remove the switch holders and check that each switch "clicks" when making contact with the gate upon closing.

24. Remove the "Magnet Test Mode key" from SR9

The Magnet Test Mode indicators change from Normal to Test.

Attempt to secure the VUV ring

Observe that the ring does not secure.

The five beacons that surround the ring are on and flashing.

The Do Not Enter sign at the gate is on.

Replace the "Magnet Test Mode Key" and turn to normal position.

25. In control room, set shutter command to "close" and return access switch to normal.

Remove red tag from the Linac low level RF and LEBT valve.

Inform the control room operator that test is complete and make request an entry in operations shift log and in interlock maintenance log.

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